

Non-fresh formaldehyde-embalmed cadaver: not an eligible model for ultrasound guided sacroiliac joint injection studies

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To the Editor,

We recently conducted an ultrasound-guided sacroiliac (SI) joint intra-articular injection feasibility study. We used six non-fresh formaldehyde-embalmed whole-body human cadavers (12 SI joints). The cadavers were embalmed with a standard formaldehyde-embalming method for anatomy dissection lectures (fig 1). All injections were performed by a board-certified physical medicine and rehabilitation physician who is familiar with this method.

A portable ultrasound machine with 2-5 MHz curvilinear array probe was used (UGEO HM70A, Samsung, Seoul, South Korea). For injection, we followed the protocol described by Chang et al [1]. However, we faced few serious difficulties. Therefore, we feel obligated to share our experience regarding our study. First, very low-quality ultrasound images were obtained. Although for SI joint injection bony landmarks are especially crucial, probe position was not always certain because of the unclear image. We also failed to improve the quality of images by injecting water on multiple tissue levels preceding the ultrasound examination. The likely explanation is the strong alteration of the tissue properties due to the embalming process. Another difficulty we experienced was the high tissue resistance on introducing the needle, having a tendency to bend and to get lost from the image.

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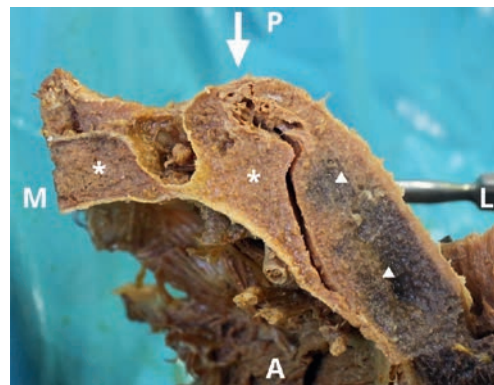


Fig 1. Cadaveric section of the sacroiliac joint. Arrow – dorsal sacroiliac ligaments; asterisks – sacrum; triangles – ilium; A – anterior; P – posterior; M – medial; L – lateral.

Likewise, the latex dye injection delivery was more difficult (high resistance) compared to the resistance that we previously found in our patients. When we dissected the cadavers one week later, we failed to identify the latex dye in four SI joints. The cause was most likely intraosseous application caused by the softening of the bone surface during the embalming process. In seven joints we found the dye peri-articularly and in one case, intra-articularly.

On the other hand, Tsui et al found the standard protocol for embalmed cadavers to be viable for ultrasound needle guidance for nerve blocks of the trunk and epidural space [2]. In a recent study Perry et al found ultrasound-guided frozen-cadavers suitable models for sacroiliac joint injection accuracy study [3]. Benkhadra et al found suitable for ultrasound-guided interventional studies [4] the embalming process according to Thiel's method (mixture consisting of monopropylene glycol, ammonium nitrate, potassium nitrate, sodium sulphite,

boric acid, chlorocresol, and a small amount of formaldehyde).

In conclusion, we suggest to not use the non-fresh formaldehyde-embalmed cadavers for US-guided interventional studies.

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